DOCUMENT RESUME

ED 401 320 TM 025 899

AUTHOR Lindner, Reinhard W.; And Others
TITLE Highlighting Text as a Study Strategy: Beyond Attentional Focusing.
PUB DATE Apr 96
NOTE 9p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York, NY, April 8-12, 1996).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Attention; *College Students; Higher Education; *Recall (Psychology); Retention (Psychology); Review (Reexamination); *Schemata (Cognition); *Study Skills
IDENTIFIERS *Highlighting (Text)

ABSTRACT

Two experiments were conducted to investigate whether the strategy of differentiating main and supporting ideas with different colored highlighter pens resulted in greater use of schema building and increased recall of information by students and whether the benefits of text marking come at the time of encoding or at the time of review. Sixty-six college students participated in the first experiment, and 1,107 in the second. A posttest-only control/comparison group design was used, with multiple-choice test testing student recall of the material. Preliminary results from the first study indicates that there was a small, though statistically nonsignificant, effect due to text marking, with two-color highlighting resulting in the greatest retention. Results of the second study did not lend further support to the findings of experiment one. Results on the immediate test were the opposite of those from the first experiment, and results of the delayed test showed that all groups scored about equally well, although the two-highlighter group showed the most gain, suggesting that the benefits, if any, from the strategy come at the time of review. (Contains three tables and eight references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 401 320

Highlighting text as a study strategy: beyond attentional focusing

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL
HAS BEEN GRANTED BY
REINHARD LINDNER

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

Reinhard W. Lindner, Ph.D.
E-mail: RW-Lindner@bgu.edu
WWW: http://www.ECNet.Net/users/mfrwl/wiu/myhome.htm

Wayne I. Gordon, Ph.D.
Bruce R. Harris, Ph.D.

Western Illinois University

Poster presented at the April 1996, annual convention of the ***American Educational Research Association***, NY, NY. (Session 18.25, poster B8)

TM025899

BEST COPY AVAILABLE

Highlighting Text as a Study Strategy: Beyond Attentional Focusing

Reinhard W. Lindner, Ph.D.
Wayne I. Gordon, Ph.D.
Bruce R. Harris, Ph.D.

Western Illinois University

In their quest for academic success students engage in a variety of study strategies with the primary aim being the enhancement of retention, and later retrieval, of information necessary for success on examinations. These strategies range from the simple to complex, and include such activities as, repetitive reading, note-taking, outlining, highlighting, underlining, summarizing and self-testing. Of these strategies, text marking (highlighting and underlining) has frequently been cited as one of the more common strategies employed by college students (Anderson & Armbruster, 1984). Furthermore, as a trip to the university bookstore will quickly reveal, highlighting and underlining remains one of the most popular and enduring study devices employed by college students. Given ease of use and lack of expense, perhaps the enduring use of these techniques should not surprise us. The question which follows, of course, is: *Does the use of highlighting and/or underlining actually facilitate learning and later performance?* In general, the results of prior research have shown only mixed or limited benefits for text marking (Blanchard, 1985; Golding & Fowler, 1992; Johnson, 1988). Although the question of whether or not the potential benefits from text marking are due to encoding effects at the time of initial study, or the rehearsal effects at the time of review, continues to be debated, the limited number of studies to date have emphasized the attentional focusing aspect of text marking. Our study was initiated to determine if prompting students to use a form of text marking as an *organizational* scheme would improve the effectiveness of this technique. More specifically, the two experiments we conducted sought to answer the following questions: (1) *Does the strategy of differentiating main and supporting ideas using different colored highlighters lead to greater use of schema building thus increasing recall of information?* and (2) *Does the benefit of text marking come at the time of encoding or at the time of review?*

Theoretical framework. The main theoretical debates in text marking research have been between the levels of processing approach (favoring a time of encoding explanation) and the so

called von Restorff effect (favoring a time of review explanation). In either case, the emphasis has been on the effect of attending to selective information, i.e., the information marked. In the first case it is the information attended to that ostensibly receives more elaborate processing, in the second, the information marked is treated as more likely to be selectively *attended to* at time of review. Attentional focusing, however, is, according to Derry (1990), the weakest type of learning tactic involving the acquisition of declarative knowledge. Stronger alternatives are schema building and idea elaboration. Hypothetically, idea elaboration should be the most powerful alternative. However, our own research with students indicates that schema building shows the highest correlation with successful academic performance (Lindner & Harris, 1993). We thus attempted to create a treatment condition that would, through the use of highlighting, induce the use of a schema building strategy. In short, our approach could be viewed as loosely allied to a levels explanation. We take a more pragmatic approach to the issue, however. That is, we argue that it is the appropriateness of processing (Bransford, 1979) relative to the task that is most likely to produce maximum payoff for the learner.

Method

In order to test our conjecture, we conducted two experiments employing a posttest-only control/comparison group design. In both experiments, our subjects were randomly assigned to one of four groups (three treatment and a control). The reading material and assessment instruments were the same for all four groups in both experiments.

Experiment one

Subjects: The subjects who participated in this study were enrolled in classes in the College of Education at a medium-sized midwestern university. Participation was voluntary, and each participant received extra credit in their class for participating in and completing both phases of the study. Sixty-six subjects participated in experiment 1, 107 in experiment 2, of which 55 were male and 116 were female. All subjects were undergraduates (except one graduate student majoring in education) enrolled in a teacher training program. In terms of ethnic composition 145 were European American (White), 14 were African American (Black), 8 were Hispanic, and 6 (7.6%) elected not to identify their ethnicity. The mean age of the subjects was 21.8 years.

Materials. The intervention for all groups required the subjects to read a chapter from the book *Teachers, Schools and Society* (Sadker & Sadker, 1994). This chapter was nine pages long (4233 words) and focused on several issues relevant to the audience participating in the study, including such topics as tomorrow's schools, teacher recognition, global education and forecasting the future in education. This particular chapter was selected because it contained novel content for the students, and yet was relevant to their course of study, thus encouraging a higher degree of motivation for the students to read the material. The chapter we selected, taken from a college text, and the conditions of study and testing were also very similar to the type of text and task our students might encounter in their normal courework, thus ensuring ecological validity.

Instruments: Two multiple-choice tests were developed by the researchers to assess students' recall of the information contained in the reading material. The immediate test, given immediately after the students read the reading material, consisted of a 20-item, multiple choice test, assessing students recall of the information from the text they studied. The delayed test (experiment 2 only), administered one week after the subjects took the immediate test, consisted of the original 20 items on the immediate test plus an additional five items (for a total of 25) designed to assess the main ideas presented in the material. The sequence of the items in the delayed test was also changed to inhibit students recognition of the items from the immediate test. On both tests, the students were to respond to one of four choices for each test item.

Procedures: All data gathering was conducted by the researchers. Prior to conducting the study, subjects were randomly assigned to one of the four groups, three treatment groups and a control group. The three treatment groups were (1) underlining, (2) single-color highlighting, and (3) two-color highlighting. The study consisted of two phases. In phase one, the subjects were given an individual packet (9x12 manila envelope) with all necessary items in the packet. The cover sheet of each packet provided detailed instructions to ensure the invention was as consistent as possible for every subject. Subjects were first asked to complete a personal information sheet, which solicited demographic information (e.g., age, GPA, year in school, ethnicity). The subjects were then instructed to read the chapter provided in the packet as if they were preparing for a multiple-choice test. They were given 30 minutes to read the material. After that point, the instructions differed depending upon which treatment group the subject was assigned. Students

assigned to the control group were instructed to not use any kind of text marking while they read the material. Students assigned to the underlining group were instructed that a "red pencil has been provided to allow you to underline any part of the reading material you may wish to." Those in the single-color highlighting group were told that a "yellow highlighter has been provided to allow you to underline any part of the reading material you may wish to." And those in the two-color highlighting group were told that a "yellow and green highlighter has been provided to allow you to underline any part of the reading material you may wish to. To insure maximum effectiveness, you should use the yellow highlighter to highlight the main (most important) ideas and the green highlighter to highlight supporting ideas." Immediately following the 30 minutes allotted for reading, the immediate test was administered. The entire session lasted about 55 minutes.

Results

Preliminary results indicate that there is a small, though statistically nonsignificant, effect due to text marking, with the two-color highlighting resulting in the greatest retention as measured by a test of recall ($F=1.08$, $p>.05$).

Table 1 **- experiment #1**

	N	Means
Control	13	15.15
Red pencil	17	14.94
1 highlighter	16	16.00
2 highlighters	18	17.00

Discussion. Results of experiment number one were in the predicted direction. Unfortunately, they did not result in a statistically significant result. Since among the many factors that may effect the likelihood of a significant result is strength of treatment, and since all students were guaranteed extra credit (possibly decreasing motivation to perform well), experiment two sought to address these issues by attempting to increase subject motivation to perform at one's highest level.

Experiment two

Experiment two was conducted approximately one month after experiment one. In this phase of the study, we decided to (1) increase motivation by offering variable extra credit based on performance on the test, (2) increase the number of subjects in our conditions to increase statistical power, and (3) to give students both an immediate and a delayed test of recall. It was thought that the fact of offering variable credit based on performance would also better approximate the conditions of testing in the normal conditions of academic coursework, thereby increasing ecological validity. Procedures were otherwise the same as indicated for experiment one.

Results

Results of experiment two, unfortunately, did not lend further support to the findings of experiment one. In this experiment the control group outscored all other groups and the 2 highlighter group had the lowest group mean on the immediate test. On the delayed test, all groups but the controls increased their test scores. The control group score actually decreased slightly. No differences were significant except for the 2 highlighter group showing the largest gain ($F = 3.78$, $p < .05$) in posttest score.

Table 2 **- experiment two, immediate test**

	N	Means
Control	27	18.07
Red pencil	26	16.88
1 highlighter	27	17.44
2 highlighters	26	16.12

Table 3 **- experiment two, delayed test**

	N	Means
Control	27	17.70
Red pencil	26	17.73
1 highlighter	27	18.56
2 highlighters	26	18.00

Conclusions

In experiment one, though none of the statistical tests performed were significant, results were in the predicted direction, that is, mean test scores did increase in the use of a two-color schema building technique.

In experiment two, we attempted to increase the power of our treatment thereby, it was reasoned, making a significant outcome more likely. Unfortunately, results on the immediate test were the opposite of those predicted and found in the first experiment. Once again, however, none of the differences were statistically significant. On the delayed test, all groups scored about equally well except that the 2 highlighter group showed the most gain suggesting that the benefit (if any) of an organizational strategy may come at time of review rather than time of initial processing. In fact, that the outcome of experiment two (for the immediate posttest) were the opposite of those predicted suggests to us that the novelty of using highlighters toward an organizational end may actually interfere with immediate learning (in the short run). That is, the effort required to engage in a novel behavior may have interfered with attention, thus affecting immediate recall. Perhaps training will be required to activate the potential benefit of using an organizational rather than an attentional approach to highlighting. This could involve, among other things, providing subjects with samples of text which have been highlighted for them as models. The fact that the 2 highlighter group showed the greatest pre-post gain is particularly suggestive in this respect. Perhaps only once the procedure of sifting text for main and supporting ideas and highlighting each with different colors has been practiced to the point of at least minimal proficiency will the potential benefits of this tactic come into play to a significant extent. Old habits are, after all, difficult to overcome.

References

Blanchard, J.S. (1985). What to tell students about underlining...and why. *Journal of Reading*, 29, 3, 199-203.

Bransford, J.D. (1979). *Human cognition: Learning, understanding and remembering*. Belmont, CA: Wadsworth.

Derry, S.J. (1990). Learning strategies for acquiring useful knowledge. In, B.F. Jones & L. IdolL. (Eds.), Dimensions of thinking and cognitive instruction. NJ: Erlbaum.

Fowler, R.L. & Barker, A.S. (1974). Effectiveness of highlighting for retention of text material. *Journal of Applied Psychology*, 59, 3, 358-364.

Golding, J.M. & Fowler, S.B. (1992). The limited facilitative effect of typographical signals. *Contemporary Educational Psychology*, 17, 2, 99-113.

Idstein, P. & Jenkins, J.R. (1972). Underlining versus repetitive reading. *Journal of Educational Research*, 65, 7, 321-323.

Johnson, L.L. (1988). Effects of underlining textbook sentences on passage and sentence retention. *Reading Research and Instruction*, 28, 1, 18-32.

Lindner, R.W. & Harris, B. (1993). *Self-regulated learning in college students: Its assessment and lessons learned.* Paper presented at the April 12-16, 1993, **AERA** anual convention, Atlanta, GA.